

Report to:
Joint Legislative Budget Committee
Arizona Telecommunications Services



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Glossary of Terms

Appendices

- A.** ***House Bill 2706***
- B.** ***Enterprise Architecture Standard***
- C.** ***Organization Charts***
 ATS
 Finance and Planning
- D.** ***ATS Services and Customers***
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I. Executive Summary

Purpose

This report has been prepared in response to requirements in House Bill 2706 (Appendix A). The Arizona Department of Administration (ADOA) and the Government Information Technology Agency (GITA) were tasked in that bill with reviewing telecommunications options and submitting a plan to the Joint Legislative Budget Committee (JLBC) by November 1, 2002. All options developed were intended to improve service delivery and increase the fiscal efficiency of Arizona statewide telecommunications services.

Recommendations

Arizona State Government should pursue either a Shared Service or a Privatized service delivery model. (These service delivery models are described in detail in the body of the report). The ADOA prepared cost analyses on both of these models. The ADOA Privatized financial analysis was based upon the State retaining ownership of the assets. Both of the ADOA cost analyses showed favorable 5-year budget impacts. An alternative Privatization scenario, private ownership of assets, is favored by GITA. However, the ADOA cost evaluation contained in the body of the report concludes that the Privatized Model appears to offer more potential.

A detailed discussion on the cost analyses begins on page 33 of the report. It should be noted that this recommendation is a radical departure from the existing service delivery model.

Further, given the internal weaknesses identified in the Factor Analysis contained within the body of the report, Arizona State Government needs to:

- Adopt a centralized governance model with strong executive authority and Legislative involvement.
- Depending upon which method of privatization is selected, centralized telecommunications funding to leverage resources and gain greater accountability may be desirable.
- Strongly consider the resources available in the private sector either through an outsource (leveraging the economies of scale available through public/private partnerships) or co-source (shared services) to improve efficiency, acquire expertise and ease the financial burden.

Study Methodology

The team used a variety of data collection methods, including an extensive review of the literature and a survey of fourteen of the largest agencies representing 80% of the State's telecommunications expenditures. Further, data analysis tools included the use of the Gartner Group Total Cost of Ownership (TCO) Manager Models. Finally, strategic analysis tools were also used, including an Internal Factor Evaluation (IFE) and an External Factor Evaluation (EFE).

Findings and Conclusions

Factor Analysis

The Internal Factor Evaluation (IFE) indicates that the current statewide telecommunications delivery systems are inadequate. Further, the External Factor Evaluation (EFE) clearly indicates that present statewide strategies are neither taking advantage of emerging opportunities nor avoiding external threats.

Gartner Analysis

The Gartner analysis indicates that there are significant opportunities for cost reductions through consolidation including personnel and transmission.

- For the Wide Area Data Network, the State spent \$2,764,056 more on transmission facilities, personnel, hardware and software than its best-in-class clone. In the area of personnel, the State has more IT WAN FTEs than would be utilized by a best-in-class organization. Personnel costs for the State were \$2,010,145 higher than the best-in-class.
- By directing more traffic to its private network (PTN access) and by utilizing dedicated circuits to long distance carriers (VNS access), the peer is able to obtain a better cost per minute than the State who is sending more traffic over the public network (VNS usage). For the Wide Area Voice Network, the State is, therefore, paying \$2,248,332 more than the best-in-class clone.

When compared with the Statewide Total Cost of Ownership figure, \$66,368,703 across all fund sources, the Gartner analysis reveals potential savings of 11%. A detailed discussion begins on page 16 of the report.

State Government and Voice over Internet Protocol/IP (VoIP) Telephony

While there were no current applications driving State government towards a wholesale implementation of VoIP/IP Telephony, there are standard business needs (e.g., infrastructure gaps, equipment obsolescence, security, and disaster recovery) that support gradual migration. A detailed discussion begins on page 12 of the report.

Service Delivery Options

Delivery of telecommunications services can vary both by structure and by method.

Four viable options were analyzed for this report: “As Is,” Decentralized, Shared Services, Privatized (Outsourced). These options are discussed in detail in the body of the report.

- The results of the cost evaluation indicate that the “As Is” and Decentralized service delivery models do not produce favorable 5-Year budget impacts.
- As discussed earlier in the recommendation section of the report, the results of the cost evaluation indicate that the Shared Services and Privatized service delivery models do offer favorable 5-Year budget impacts with the Privatized Model offering the most potential. Between the Shared Services and the Privatized views, five-year savings ranging from \$3.6 million to \$5.6 million would be realized over the current service delivery model.

- Privatization offers significant benefits to the State: 1) the State gets already trained and competent personnel for new technologies, 2) if the vendor provides the equipment and services, the State does not need to make large capital investments, 3) with the rapid changing of technology and evolving standards with VoIP/IP Telephony, the State avoids the position of servicing debt on obsolete equipment as the vendor is now responsible for upgrading the technology, 4) vendor management is simplified, and 5) Service Level Agreements (SLAs) are financially driven.

With the privatized model, there is a wide spectrum of options for private sector participation. These options may be classified into two groups: those that retain public ownership of the assets while contracting out management, operation, and even investment, and those that involve at least partial or temporary private ownership of assets.

Short-Term Cost Savings Opportunities

Ten potential short-term cost savings opportunities totaling \$5,025,000 were identified by a team composed of the Governor's Office of Strategic Planning and Budgeting, GITA, Department of Administration, and four (4) agencies.

The short-term costs savings opportunities included \$2.5 million for the sale and lease-back of the Arizona telecommunications services central switching mechanism. ATS solicited information from equipment wholesalers, equipment manufacturers, and telecommunications carriers to determine the residual value of the MSL-100. No one expressed interest in buying the switch outright. However, several parties were interested in obtaining the switch as part of a package deal to buy the customer base or as a trade-in against new equipment acquisitions.

The short-term cost savings opportunities included \$700,000 through the prepayment of carrier services. This option was eliminated from consideration due to issues regarding the financial viability of various telecommunication carriers, Federal restrictions, and cash flow concerns.

Of the \$1,825,000 remaining amount, \$1,523,571 in savings has been realized and efforts continue on this initiative.

Next Steps

- Seek any legislative changes required to adopt a centralized governance model with strong executive authority and Legislative involvement.
- Seek legislative changes, if required, to centralize telecommunications funding.
- Establish a telecommunications stakeholder committee with Legislative input.
- Secure an appropriation for consultant support to draft a Request for Proposal (RFP), understanding that the outside consultant would be removed from bidding.
- Convene RFP committee, establish a charter, assign work groups, and define requirements.
- Create an RFP to outsource all statewide telecommunications operations with Service Level Agreements (including call center operations, billing, and customer relationship elements) that would provide full flexibility for vendors to bid on all degrees of ownership.
- Finalize, publish and issue the RFP.
- Review RFP responses including vendor responses regarding Statewide FTE transition.
- Award contract(s). Target: October 2003.

Introduction

This report has been prepared in response to requirements in House Bill 2706. The Arizona Department of Administration (ADOA) and the Government Information Technology Agency (GITA) were tasked in that bill with reviewing telecommunications options and submitting a plan to the Joint Legislative Budget Committee (JLBC) by November 1, 2002. These options could include: 1) updating technology, 2) privatizing the delivery and support of telecommunications services and/or 3) allowing agencies to procure their own telecommunications services. All options were intended to improve service delivery and increase the fiscal efficiency of Arizona telecommunications services.

Given the current budget crisis faced by the State of Arizona, this plan focused intensely on opportunities for savings. Three areas for savings were analyzed: 1) short-term cost savings opportunities, 2) updating technology, and 3) service delivery of statewide telecommunications options.

II. General Background Arizona Telecommunication System (ATS)

Per Arizona Revised Statutes (ARS) §§41-801, 41-798, and 41-713, the Arizona Department of Administration (ADOA) Arizona Telecommunications System (ATS) is the executive branch entity charged with providing voice, video and data telecommunications capabilities and services to State agencies and political subdivisions. This mandate is fulfilled through public-private partnerships, statewide contracts, and state-owned campus infrastructure in Phoenix and Tucson.

- A. Year Created** – ATS legislation was established in 1951 with the primary intent to allow for negotiation of long distance rates for the State. In 1988-89, State-owned centralized telephone systems were installed in Phoenix and Tucson. In June of 1997, House Bill 2440 amended the Arizona Revised Statutes to allow among other provisions the extension of ATS to include any transmission of voice, data, video or graphic images.
- B. Statutory Authority** – The ATS within the Arizona Department of Administration is the only entity with statutory authority to provide statewide telecommunication services per ARS §§41-798 and 41-801. Enabling legislation relative to the funding of ATS is found in ARS §41-713.
- C. Legislative Intent** – The legislative intent behind the creation of ATS was to provide cost-effective, efficient, statewide telecommunications services.
- D. FY03 Appropriations Bill (HB2706)** –House Bill 2706 requires a report outlining opportunities to improve service delivery and decrease operations costs associated with statewide telecommunications services. Based on information given to the Appropriations Committee Chairpersons by various groups, the hypothesis was that the State could save significant dollars by changing to a Voice over Internet Protocol/Internet Protocol (VoIP/IP) telephony telecommunications environment and by decentralizing telecommunications service delivery.

E. ATS Challenges/Key Findings – The challenges facing ATS today are:

- Transitioning to a VoIP/IP Telephony environment without increasing strained budgets.
- Assisting GITA and the agencies in analysis of Project Information Justification (PIJ) submissions to understand the total cost of ownership/net cash flow to the State.
- Removing non-enterprise related costs from the ATS rate base.
- Upgrading billing and order processing systems.
- Acquiring the executive sponsorship necessary to consistently, effectively, and successfully deliver telecommunications services to the State.

IV. *ATS Size and Scope*

A. *Organization & Staffing*

The ATS organization reports to a Deputy Assistant Director in the Information Services Division (ISD) of ADOA. The Deputy Assistant Director and three (3) subordinate supervisors provide leadership and direction for ATS. The subordinate supervisors are responsible for the following areas: 1) Project Management, 2) Operations, and 3) Service Center. Additionally, ATS provides Switchboard Services for the Capitol Mall area and the Tucson campus. The Switchboard has 18 full-time equivalents (FTEs) responsible for providing assistance to government entities and the public Monday through Friday from 7:00 am to 10:00 pm and on Saturdays from 7:00 am to 5:00 pm.

The Projects Group has 5.5 FTEs responsible for and/or intimately involved in:

1. Service analysis – responsible for development of service approaches, proposals, billing reviews, Interagency Service Agreements/Service Level Agreements, PIJs and project management.
2. Architecture – engineering analysis and design for voice and data, advanced (tier 2/3) technical support, Request For Proposal (RFP) development, and vendor contract compliance and project management, and
3. Projects – perform direct project management and oversight of vendor-led projects (call center, network and telephone system analysis, design, and construction); tailor and enforce project management approaches; develop and implement project tracking tools, processes, etc.; assist Finance and Planning with ATS rates development; and, service support contract development.

The Operations group has 12 FTEs responsible for:

1. Network Engineering:
 - Web Services – provide and support Web Application services, Web Mail service, and Domain Name resolution.
 - Wide Area Network – provide, manage and support data network connectivity to and from agency main offices to remote offices throughout the state; connectivity to the State of Arizona data network (inter-agency); broadband Internet access; Internet Protocol (IP) address management via Dynamic Host Configuration Protocol (DHCP); and, remote access solution for agency telecommuters via an Internet Virtual Private Network (VPN) server.

2. Voice Engineering:
 - Call Center Operations – support call center platform including the 81C, Nortel Enhanced ACD (Symposium), Nortel Open IVR with CTI, Symon, Headliner, Melita Predictive Dialer, and TCS.
 - Voice Services – provide and support trunking, call routing, dial tone to agencies on and off the Capitol Mall in Phoenix and Tucson.

The Service Center has 15 FTEs responsible for:

1. Voice Messaging – provide training and support the Octel system for voice mail, auto attendant, fax on demand and survey.
2. Telephone Sets – provide training and support programming on single and multi-line telephone sets.
3. Answer, route and resolve service requests and help desk calls.
4. Perform move, add, change and repair activities at all ATS customer locations.
5. Log and track service requests and help desk calls.
6. Generate ongoing and as-needed reports.
7. Maintain inventories of equipment, circuits, and services.
8. Manage customer notification (broadcasts of upcoming planned outages, etc.).
9. Maintain directory database.

The Finance & Planning (F&P) group within ISD is responsible for ATS billing services. There are 5 FTEs who are responsible for:

1. Processing carrier and vendor bills for services procured by ATS.
2. Billing the agencies for ATS services.
3. Validating payment of bills for ATS services.
4. Performing bill audits.

Organizational charts for ATS and F&P are in Appendix C.

B. ATS Five Year Financial Summary

(In Thousands)

TABLE 1: ATS FIVE YEAR FINANCIAL SUMMARY					
	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Total Revenue	12,560.4	11,457.9	12,147.7	13,557.1	14,037.1
Total Expenditures	11,023.0	12,383.9	13,124.3	13,799.2	13,743.2
Net Income	1,537.4	(926.0)	(976.6)	(242.1)	293.9
Cash Balance*	5,249.2	3,027.1	3,641.8	2,047.9	3,548.0

*ATS proportionate share of T & T Fund Cash Balance

C. Current Business Model

The State of Arizona's current business model for telecommunication services is a combination of centralized and decentralized structure and service delivery provided in-house and by vendors.

ATS provides services to approximately 30 percent of the State's 42,000 employees. For the approximately 70 percent of employees not utilizing ATS, their services are either provided in-house by their agency or procured directly from the vendor via ATS-developed contracts.

D. ATS Services Summary

ATS provides an array of enabling and enhancing voice and data services. ATS services range from one to many services that include telephone voice services, Internet access, Inter-LATA communications, WAN (wide area networking), web hosting, and call center services. Appendices D1 through D3 detail services delivered by ATS to the agencies.

E. ATS Customer Base

ATS has approximately 14,000 telephone subscriber lines established with the State's Capitol Mall and Tucson complex. One hundred and seventeen (117) State agencies are purchasing one or more services from ATS. A detailed breakdown of the agencies and services ATS is providing is listed in Appendices D4 through D6.

F. Infrastructure

In its role as the primary provider of voice and data telecommunications services to State agencies, ATS has evolved a physical architecture for service delivery that reflects the concentration of State agency headquarters and major offices in the Phoenix and Tucson areas. The Capitol Mall in central Phoenix, and the State complex in downtown Tucson have State-owned conduits and fiber optic and copper cabling throughout each facility. The Phoenix Capitol Mall and the Tucson Complex are tied together by a redundant inter-LATA (Local Access and Transport Area) high-speed OC-3 service leased from a major inter-exchange carrier. Additional leased circuits provide voice and data communications to many agency field offices throughout Arizona. A voice circuit schematic diagram is provided in Appendix I and a data circuit schematic diagram is provided in Appendix J.

ATS provides Capitol Mall telephony services via a Nortel MSL-100 telephone system. Three distributed fiber-interconnected on-Mall fault-tolerant remote switches complement the system. In total, the system serves approximately 14,000 subscriber lines. All ATS telephony services provided through the Nortel MSL-100, with the exception of a small VoIP/IP Telephony pilot system, is TDM (Time Division Multiplexing) based utilizing copper cable from the MSL-100 or its remote switches to the customer telephone handset. The Nortel MSL-100 has been IP-enabled to allow telephone communications to occur over data networks.

In addition to the Capitol Mall, ATS supplies telephony services to the State Tucson Complex via a Nortel Option 81C-telephone system. The systems serve approximately 1,200 subscriber lines and, like the Nortel MSL-100, is based on TDM technology.

ATS's shared data network is called MAGNET (Multi-Agency Network). MAGNET is a Cisco-based Fiber Distributed Data Interface (FDDI) network, which connects 29 buildings on the Phoenix Capitol Mall and the two Tucson Complex buildings. In layman's terms, MAGNET is the shared network for agencies throughout State Government. MAGNET supplies customers with high-speed data and Internet connectivity. ATS also provides long distance voice connectivity to a select group of State facilities, including the Arizona Departments of Corrections and Game & Fish. This type of voice connectivity provides toll bypass capabilities, i.e., the ability to conduct long distance voice calls over a (semi) private State data network.

Off-Mall/Tucson Complex connectivity to the general public and remote State offices is accomplished through circuits owned and operated by multiple telecommunication carriers. These carrier circuits are typically leased by the State on a multi-year contract basis. In general, the types of circuits used are dedicated and switched lines that vary in speed and performance (e.g. 56K/T1, T3, OC3, etc.). These services are delivered via wire and/or wireless systems. ATS's primary host link circuits, i.e., the large aggregated broadband service feeds between the carriers' facilities and the Capitol Mall and Tucson Complex are built with redundancy in mind.

V. Short-Term Cost Savings Opportunities

Ten potential short-term cost savings opportunities totaling \$5,025,000 were identified by a team composed of the Governor's Office of Strategic Planning and Budgeting, GITA, Department of Administration, and four (4) agencies. Of those ten recommendations:

- Two have been completed, generating savings of \$432,091:
 - ATS Toll Reduction – Historically, toll rates have been set artificially high to cover the costs associated with the Data Network. Due to careful management of the Data Network costs, ATS realized a \$293,910 gain in FY 2002. Effective November 1, 2002, ATS will be able to reduce toll rates by 5.5% to return the over-recovery to the customer agencies.
 - Reduce Carrier Rates – ATS solicited rate reduction proposals from current carriers. Only one carrier, WorldCom responded. WorldCom proposed, and the State accepted, a proposal to lower its calling card surcharge from \$1.60 to \$0.75 per call. FY 2003 savings associated with this reduction are estimated to be \$138,181.
- Two have been eliminated from further consideration for the reasons stated below:
 - Lease of Wide Area Network (MAGNET) – Eliminated from consideration since no capability exists to divide up capacity. Inclusion of MAGNET as part of a managed services bundled delivery mechanism is under study.
 - Pre-Pay Carrier Services Contracts - Eliminated from consideration due to issues regarding financial viability of various telecommunication carriers, Federal restrictions, and cash flow concerns.

- Six are still in process and have generated savings of \$1,091,480.
- Carrier Reconciliation – After discovering irregularities with QWest billings to ATS, ADOA initiated QWest audits of its billings dating back to September 2000. These audits revealed over-charges totaling \$504,529. Subsequently, ADOA issued a demand for assurance letter to QWest requiring audits of all QWest billings to State Agencies. Three of those additional audits have been completed or are in the review stage, recovering \$474,399. A timeline for the remaining audits is shown in the following table.
- Re-engineering the Wide Area Network – ATS re-engineered Centrex Plus Network Access Registers saving \$66,720. Additionally, by changing the current 800 Service Line to New Service, ATS will realize savings of \$12,500 in FY 2003 and \$25,000 in FY 2004. ATS continues to seek other cost savings opportunities through re-engineering.
- Toll By-Pass – There are 16,632,576 minutes currently going over the private tandem network reducing Statewide telecommunications costs. ATS is currently exploring opportunities to move more traffic to the PTN by the end of the calendar year, which will result in additional savings of \$33,332 in FY 2003 and \$66,664 for every year thereafter.

As the State upgrades the Data Network and moves traffic onto the converged network, additional opportunities for toll by-pass savings are created. Once full voice and data convergence is achieved, net annual savings of approximately \$2 million is anticipated.

- Centralizing Telecommunications Further – Included with the shared services and privatized service delivery options discussed later in this report.
- Nortel MSL-100 Sale and Lease-Back – ATS solicited information from equipment wholesalers, equipment manufacturers, and telecommunications carriers to determine the residual value of the MSL-100. No one expressed interest in buying the switch outright. However, several parties were interested in obtaining the switch as part of a package deal to buy the customer base or as a trade-in against new equipment acquisitions. These scenarios are being considered and are discussed later in this report.
- Trunking Reduction – On hold due to concerns about reducing the quality of service to the citizens of Arizona.

TABLE II: STATUS TELECOMMUNICATIONS REDUCTION OPTIONS

Options:	Estimated Completion Date	Proposed Total	Results To Date Total
Toll Bypass:	On-going	500,000	33,332
1. ATS			33,332
2. Non-ATS			
Toll Reduction:	Complete	200,000	293,910
ATS will reduce toll charges by 5.5% to Return FY 2002 over-recovery to customer Agencies.			
Trunking Reduction:	On Hold	100,000	0
On hold, pursue all other opportunities before impact service quality			

TABLE II: STATUS TELECOMMUNICATIONS REDUCTION OPTIONS

Options:	Estimated Completion Date	Proposed Total	Results To Date Total
MSL100 Sale and Lease-back:	RFP	2,500,000	TBD
1. Vendors willing to pay \$4M for State telecom business - same as Financing \$4M 2. RFP for final financials 3. Refinance MSL100 asset			
Carrier Reconciliation:	Ongoing	300,000	978,928
1. ATS a. Qwest over-billing ATS rates b. RFP pending ATS inventory audit c. WorldCom ATS rate reconciliation	Completed 6/12/02 To Be Awarded Included in b above.		504,529
2. Non – ATS a. DES b. Arizona Lottery c. Arizona Department of Transportation d. Department of Public Safety e. Department of Corrections f. AHCCCS g. Department of Health Services h. Supreme Court i. Department of Game and Fish j. Department of Environmental Quality k. Department of Juvenile Corrections l. All Remaining Agencies	7/15/02 – 9/15/02 Completed 10/25/02 8/12/02-10/15/02 9/11/02 – 11/15/02 11/11/02 – 1/15/03 9/11/02 – 11/15/02 10/14/02 – 12/15/02 11/11/02 – 1/15/03 9/11/02 – 11/15/02 10/14/02 – 12/15/02 8/12/02-10/15/02 12/12/02 – 2/15/03	Under Review On-going	472,175 2,224
Reduced Carrier Rates:	Complete	100,000	138,181
1. WorldCom calling card surcharge reduction From \$1.60 to \$.75 2. Qwest – No Proposal	7/1/2002 – 6/30/03		138,181 0
Lease of Magnet:	Complete	75,000	0
No capability to divide capacity. Only option is as part of a managed services bundled delivery mechanism			
Centralizing Telecommunications Further:	Under Review	500,000	0
ADOT \$500K Other Agencies \$75K On hold pending completion of JLBC Report.			
Re-engineering WAN:	Ongoing	50,000	79,220
1. Continued audit/grooming – Qwest Centrex Plus Network Access Registers 2. Vendor proposal \$1.5M savings Review invalidated proposal 3. Change 800 Service Line to New Service			66,720 REJECTED 12,500
Pre-Pay Carrier Costs:	Complete	700,000	REJECTED
1. Qwest ATS proposal 8.15% 5/28/02 2. WorldCom 7% - 7/12/02	325,000 37,000		REJECTED REJECTED
Rejected Due to: a. Financial viability of all Carriers at this time.			

TABLE II: STATUS TELECOMMUNICATIONS REDUCTION OPTIONS			
Options:	Estimated Completion Date	Proposed Total	Results To Date Total
b. Agencies would have to pre-pay ATS & have no incentive since no savings being passed to them. Additionally there are cash flow issues for Agencies that get Federal funds. These agencies would have to take money from one fund and payback as they get their Federal funds.			
Total		5,025,000	1,523,571

VI. *Data Collection Methodology VoIP/IP Telephony & Service Delivery Options*

To understand the impact of VoIP/IP Telephony and the various telecommunications service delivery options for the State, substantial information was required. Specifically, the team solicited the following data:

- Financials for preparation of a current Total Cost of Ownership (TCO).
- An inventory of current voice and data services and equipment.
- Agency business needs.
- Other government entities and private industry Best Practices.
- Technology trends.

The methodology used for collecting and analyzing the information gathered included both secondary (review of Best Practices and technology trends) and primary research. Secondary research included reviewing technology initiatives and Requests For Proposals from other states including Georgia, Texas, Alaska and the City of San Diego, and information gathered from members of the National Association of State Telecommunications Directors (NASTD), the association for telecommunications and technology professionals in State government. The secondary research also included reviewing Public Sector technology journals, IT trade journals, and historical reports and documents produced by various agencies within the State of Arizona and meetings with vendors. In addition, industry watchdog organizations like the Gartner Group were consulted and white papers reviewed.

Primary research included extensive data collection from fourteen (14) agencies of their costs, inventory of telecommunications equipment and services, and business needs. The Gartner Group Total Cost of Ownership (TCO) Manager Models were licensed and utilized to measure the State's wide area data and voice costs in areas of personnel, transmission, and other related costs as a baseline, and in comparison to the best-in-class. In addition to the data collected with the Gartner models, the project team gathered a detailed inventory of the wide area data and voice equipment and services. Existing sources of information were reviewed to obtain the necessary data. These included the GITA Information Services Inventory System (ISIS), Telco Control (inventory of all circuits), the Arizona Financial Information System (AFIS), agency IT Strategic Plans from the GITA Planning Application for Reporting IT Strategy (PARIS), and State and public telephone directories.

To complete the data collection, information was needed from the State agencies. As collecting data from 100% of the agencies was not viable within the timeframe needed, in-depth data collection was conducted with fourteen (14) of the largest agencies representing 80% of the State's telecommunications expenditures. Originally, fifteen (15) agencies were asked to participate, however, one agency¹ failed to return their information within the designated timeframe needed for the analysis. A list of the fourteen (14) agencies is in Appendix E.

The information from these agencies was used to extrapolate data collection needs for the remaining agencies. An orientation meeting was conducted with the original fifteen (15) agencies to outline the objectives of the statewide initiative and to establish the agency contacts. In addition, one-on-one meetings were held with agency telecommunications management to identify the needs and requirements of their respective agencies for the next five (5) years. The emphasis was on requirements that would move them toward VoIP/IP Telephony as well as general telecommunications needs. Information on their customer care processes, the skill sets of their IT personnel, and feedback on ATS-provided services was also gathered. Focus group sessions were conducted with agencies grouped into "communities of interest" to explore business needs that might drive them toward VoIP/IP Telephony technology. The focus group sessions included the fifteen (15) agencies as well as other agencies that fit into particular "communities of interest." Additional sessions were conducted with the ATS personnel to identify specific strengths, weaknesses, opportunities, and threats (SWOT) related to migration to VoIP/IP Telephony, priorities within each category of the SWOT, and strategies based on the SWOT.

VII. Best Practices & Industry Trends

A. State Government

A number of state governments were interviewed with regard to their experiences and need to move toward VoIP/IP Telephony technology, and to consider privatized or other service delivery models. After lengthy discussions and research, it was determined that there is no mainstream movement or driving business application need by these state governments to upgrade to VoIP/IP Telephony. Each state is making decisions based on their own criteria.

While there were no business applications driving the transition to VoIP/IP, there were four clear business drivers for the outsourcing decision including a gradual migration to VoIP/IP Telephony:

- The lack of staff with the core competencies required for converged voice and data technology.
- Better pricing with a comprehensive contract.
- The lack of up-front funding necessary to move to newer technology.
- The concern about investing substantial sums of money in rapidly changing technology that may be obsolete before the financing term is complete.

¹ The Department of Education provided information on their data network architecture but failed to provide TCO information and therefore the Agency was excluded from the primary research.

Additionally, some states (New York and Pennsylvania) weary of years of endless dialogue, bickering, and no positive action on the part of their state agency Chief Information Officers, simply sought alternative service delivery options.

B. Private Industry

Much like carriers who have looked to the Voice over Internet protocol (VoIP) as a strategic way to significantly lower bottom-line costs, private enterprise/business is looking to combine their voice and data networks and lower expenses. In a July 2002 article, *Survey: VOIP Moves Beyond Cost-Cutting*, published in Business Communications Review, Jim Metzler of Ashton, Metzler & Associates reports that despite the economic downturn, more organizations have been implementing VoIP systems, and are putting ever-increasing amounts of traffic over them. Mr. Metzler's conclusions are based upon a survey of Networld+Interop attendees, subscribers to Business Communications Review or attendees at BCR's VoiceCon.2002 Conference. Of the 440 qualified respondents, 28 percent indicated that they are currently using/implementing VoIP, 51 percent planned to evaluate or deploy VoIP during the next year and only 21 percent had no plans to use or evaluate VoIP technology. According to John Ridley, senior enterprise network architect at Coca-Cola Enterprises, "Packetized voice is inevitable."

The article also indicated that:

- Those companies utilizing VoIP reported that they are already using it to transmit 20 percent or more of their voice traffic and
- Those planning to implement expect to reach similar levels within the next year.

Additionally, ninety percent of the companies that had deployed VoIP reported satisfaction levels of 3 or higher on a 5-point scale (1 = not at all satisfied; 5 = very satisfied) and fifty eight percent chose 4 or 5.

Lastly, the respondents reported implementation challenges similar to those found in government deployments:

- Immature technology.
- Lack of staff (network engineers) with both voice and data experience.
- Equipment interoperability.
- Finding the budget for a purchase.

C. Vendor Positioning in Marketplace

The Gartner Group provides information on the state of VoIP in a technology white paper dated April/May 2002, "VoIP: Implementing New Mission-Critical Applications." The VoIP technology is still considered to be in the "early adoption" stage, with some vendors not expected to survive through 2004. Vendors who are considered to be "Leaders" (high on ability to execute and Visionary) are Avaya, Cisco and Nortel. The Niche Players (lower on ability to execute and moderate in their Vision) are Alcatel, Mitel, NEC, Shoreline, Siemens, and 3Com.

VIII. Data Collection & Analysis

A. Statewide Telecommunications Services Total Cost of Ownership

The Statewide Telecommunications Services Total Cost of Ownership was developed using the Gartner Total Cost of Ownership (TCO) Manager Models in conjunction with primary research by the project team. The Gartner Group Total Cost of Ownership (TCO) Manager Models were designed to measure the wide area data and voice services costs in areas of personnel, circuits, and other related costs as a baseline in comparison to like institutions. Gartner “Best Practices” comparisons were used. These models are used to determine:

- Cost areas that are out of line to best-in-class, determine causes, and implement improvement plans.
- Toll costs and benefits of vendor negotiations (re-negotiations) and/or toll bypass options.
- Review Best Practices (or lack of) and the effect on contract costs and operations.

The TCO has provided identification of IT costs that many agencies do not normally separate out in their IT budget. In addition, the TCO gives the State a baseline of their telecommunications costs for comparison to other options in determining fiscal efficiencies.

As shown in the table on the following page, the Statewide Telecommunications annual operating costs are \$55,011,596. Annual capital expenditures are \$11,357,107. The annual Statewide Telecommunications Services Total Cost of Ownership is \$66,368,703. The figures presented above represent the totals across all funding sources.

TABLE III: TOTAL COST OF OWNERSHIP	
Operations	FY 2002 Totals
Personnel:	
WAN	5,145,793
Voice	3,700,171
Total	8,845,964
Hardware & Software Maintenance & Licensing	
WAN Hardware-Maintenance	929,517
Total	929,517
WAN Software-Maintenance	410,278
Total	410,278
Voice Hardware – Maintenance	777,910
Total	777,910
Voice Carrier Usage Charges	9,334,161
Misc. 7172 & 7173	20,861
Total	9,355,022
WAN Transmission Circuits	4,221,163
Voice Carrier Circuits	6,911,127
PTN Circuits	708,562
Subtotal	12,055,544
Circuits from 7179 (balance)	22,011,289
Subtotal	34,066,833
Miscellaneous 7179	597,557
Total	34,664,390
Internet	
Advanced Services	24,520
Total	24,520
Tele-management Expense:	3,995
Total	3,995
Total WAN/Voice Operating Expenses	55,011,596
Capital	
WAN Hardware-Depreciation	2,199,275
WAN Software-Depreciation	121,416
Voice Hardware – Depreciation	1,551,428
Non-Specific Capital	7,484,988
Total WAN/Voice Capital Expenses	11,357,107
STATE WAN/VOICE TCO 2002	66,368,703

GARTNER STATEWIDE FINDINGS:

Wide Area Data Network

- Using variables such as sites, devices, and traffic, the State performs 19% less efficiently than its best-in-class clone. The Gartner model uses these variables, together with Best Practices, to factor what should be spent on transmission facilities, personnel, hardware and software. The table below depicts this information. As shown here, the State is paying \$2,764,056 or 19% more than the best-in-class model.

Gartner Analysis Overview	Actual	Best-in-Class Simulation	Simulation - Actual	% Difference
Transmission	\$4,137,187	\$6,232,209	\$2,095,022	51%
Personnel	\$5,133,905	\$3,123,760	-\$2,010,145	-39%
Hardware and software	\$5,128,698	\$2,279,765	-\$2,848,933	-56%
Total	\$14,399,790	\$11,635,734	-\$2,764,056	-19%

- In the area of personnel, the State has more IT WAN FTEs than would be utilized by a best-in-class organization. The State has 97.2 FTEs, where the best-in-class has 31.93 FTEs, a 67% difference. The table below shows the FTEs broken into the 3 major categories of management, operations and administration as compared to personnel required by its counterpart.

Personnel Summary	Actual	Best-in-Class Simulation	Simulation - Actual	% Difference
Personnel Cost				
Management Cost	\$1,170,677	\$1,309,536	\$138,859	12%
Management FTEs	17.40	11.53	-5.87	-34%
Operations Cost	\$3,711,529	\$1,405,845	-\$2,305,684	-62%
Operations FTEs	74.30	16.77	-57.53	-77%
Administration Cost	\$251,699	\$408,379	\$156,680	62%
Administration FTEs	5.50	3.62	-1.88	-34%
Total Cost	\$5,133,905	\$3,123,760	-\$2,010,145	-39%
Total FTEs	97.20	31.93	-65.27	-67%

Wide Area Voice Network

- By directing more traffic to its private network (PTN access) and by utilizing dedicated circuits to long distance carriers (VNS access), the peer is able to obtain a better cost per minute than the state who is sending more traffic over the public network (VNS usage). The resulting savings are shown below.

Transmission Summary	Actual	Best-in-Class Simulation	Simulation - Actual	% Difference
PTN access	\$734,393	\$1,058,106	\$323,713	44%
VNS access	\$121,275	\$545,671	\$424,396	350%
VNS usage	\$7,064,584	\$5,475,349	-\$1,589,235	-22%
Total	\$7,920,252	\$7,079,126	-\$841,126	-11%
Average Cost per minute rate (not including International, Calling Card, or Cellular)	\$0.0960	\$0.0628	-\$0.0331	-35%
Savings based on State minutes of 67,720,856	\$ 6,501,202.18	\$4,252,869.76	-\$2,248,332.42	-34%

- In the area of personnel, the State has more FTEs involved with managing their private and public voice networks than would be utilized by a best-in-class organization. The State has 23.32 FTEs, where the best-in-class has 6.36 FTEs, a 73% difference.

Personnel Summary	Actual	Best-in-Class Simulation	Simulation – Actual	% Difference
Personnel cost				
Management Cost	\$107,420	\$246,242	\$138,822	129%
Management FTEs	4.49	1.62	-2.87	-64%
Operations Cost	\$204,760	\$106,567	-\$98,193	-48%
Operations FTEs	8.45	3.12	-5.33	-63%
Administration Cost	\$260,098	\$111,414	-\$148,684	-57%
Administration FTEs	10.38	1.62	-8.76	-84%
Total Cost	\$572,278	\$464,223	-\$108,055	-19%
Total FTEs	23.32	6.36	-16.96	-73%

Gartner Recommendations

1. In order to improve efficiency in the area of network data gathering, which can impact overall efficiency levels, standardize and encourage the deployment of Best Practices throughout the State in the areas of network management tools, processes, and implementation and standardized change management processes and implementation. Periodically measure the efficiency and implementation of their deployment.
2. Based on the implementation of Best Practices in the areas of vendor management, contract management and procurement agreements, utilize negotiated vendor contracts to procure best available statewide pricing on volume purchases and services and identify a set of standard vendors that can function as the primary resources for purchasing equipment and services as a means for reducing costs.
3. Closely review IT personnel and functions to determine redundancy and redeployment opportunities.
4. The migration to private networks and utilizing more dedicated services instead of the public switched network for voice services can provide savings throughout the State.

GARTNER DEPARTMENT OF ADMINISTRATION ONLY FINDINGS:

The Department of Administration requested a comparative analysis for the Arizona Telecommunications System (ATS), which provides support for 14,000 telephone lines to approximately thirty (30) percent of the State's employees throughout the various agencies.

The following findings have resulted:

Wide Area Data Network

Using variables such as sites, devices, and traffic, the ATS performs 11% less efficiently than its best-in-class clone. The Gartner model uses these variables, together with Best Practices, to factor what should be spent on transmission facilities, personnel, hardware and software. Overall, the total difference of \$228,601 is not significant, but may identify opportunities for better efficiencies in purchasing and utilizing hardware and software.

MPN TCO Analysis Overview	ATS	Best-in-Class Simulation	Simulation - ATS	% Difference
Transmission	\$796,227	\$954,683	\$158,456	20%
Personnel	\$481,586	\$498,084	\$16,498	3%
Hardware and software	\$757,334	\$353,778	-\$403,556	-53%
Total	\$2,035,147	\$1,806,546	-\$228,601	-11%

In the area of personnel, ATS has more FTEs than would be utilized by a best-in-class organization. ATS has a total of 9.5 FTE, where the best-in-class has 5.09 FTE, a 46% difference. Inversely, ATS' total personnel costs are lower. The table below shows the FTEs broken into the 3 major categories of management, operations and administration as compared to personnel required by its counterpart.

Personnel Summary	ATS	Best-in-Class Simulation	Simulation - ATS
Management Cost	\$153,924	\$208,806	\$54,882
Management FTEs	2.50	1.84	-0.66
Operations Cost	\$313,257	\$224,162	-\$89,095
Operations FTE	6.50	2.67	-3.83
Administration Cost	\$14,405	\$65,116	\$50,711
Administration FTE	0.50	0.58	0.08
Total Cost	\$481,586	\$498,084	\$16,498
Total FTE	9.50	5.09	-4.41

Wide Area Voice Network

ATS was not shown to be significantly different from its best-in-class counterpart in the total transmission costs for its private (PTN) and public (VNS) networks. ATS' cost per minute is only \$.01 higher as shown below. This would indicate that ATS is incorporating Best Practices in the areas of managing network costs and negotiating best rates with Carriers.

Transmission Summary	ATS	Best-in-Class Simulation	Simulation - ATS
PTN access	\$221,256	\$697,595	\$476,339
VNS access	\$87,735	\$176,591	\$88,856
VNS usage	\$4,626,315	\$3,386,612	-\$1,239,703
Total	\$4,935,306	\$4,260,798	-\$674,508
Cost per minute	\$0.0764	\$0.0654	-\$0.0110

ATS was not shown to be significantly different from its best-in-class counterpart as shown from the tables below. Looking at the first table, total costs for transmission, personnel and hardware/software differ by less than 11%.

TCO Analysis Overview	ATS	Best-in-Class Simulation	Simulation - ATS
Transmission	\$4,935,306	\$4,260,798	-\$674,508
Personnel	\$126,788	\$388,911	\$262,123
Hardware and software	\$718,170	\$495,116	-\$223,055
Total	\$5,780,264	\$5,144,825	-\$635,439

In the area of personnel, ATS has fewer personnel that are dedicated to the management, operations and administration of the Voice Network than its best-in-class counterpart. The Voice Network is related to circuits and Carriers providing private and public network access. Based on the analysis, more FTEs may be necessary to manage a network of this size.

Personnel Summary	ATS	Simulation	Simulation - ATS
Management Cost	\$28,844	\$196,687	\$167,843
Management FTEs	0.45	1.39	0.94
Operations Cost	\$95,063	\$98,886	\$3,823
Operations FTEs	2.10	2.66	0.56
Administration Cost	\$2,881	\$93,339	\$90,458
Administration FTE	0.10	1.39	1.29
Total Cost	\$126,788	\$388,911	\$262,123
Total FTEs	2.65	5.44	2.79

Gartner Recommendations

Based on the analysis of ATS' Wide Area Data and Wide Area Voice networks, the data shows:

1. ATS WAN operational efficiency based on its supported base does not vary significantly from best-in-class.
2. Although ATS WAN has more FTEs than best-in-class, the overall dollars spent are less.
3. ATS Voice Networks is operating near best-in-class in expenditures of network costs.
4. ATS Voice Networks has fewer FTEs than best-in-class.

B. Business Application Requirements

While there were no immediate driving applications identified by the fourteen (14) agencies that would cause them to move toward the implementation of VoIP/IP Telephony, there are standard business needs that are driving technology upgrades. Specifically, the need to replace telephone PBXs and small office Key Systems that are near or past their useful life and the ability to reduce overall costs through savings initiatives such as toll bypass available with newer technology. Many agencies are, therefore, upgrading to equipment that is capable of providing these services during their normal equipment refresh cycles. Anytime equipment needs to be replaced or refreshed agencies are moving towards the GITA Enterprise Architecture Target Standards and positioning themselves for VoIP/IP Telephony. As a matter of course, some agencies are further along in their preparedness than others.

The needs of the respective agencies reviewed are wide and varied, ranging from the necessity to complete basic infrastructure build-out, to initial installations of new technologies.

Listed and ranked below are some of the more important needs that were identified by three (3) or more agencies.

<u>Expected Benefit</u>	<u># Agencies responding</u>
Reduce overall costs	14
Toll bypass cost savings	9
Equipment refresh	8
Increased security	7
Seamless voice & e-mail across agencies	6
Videoconferencing	3

Several focus sessions were held with the agencies, gathered into "communities of common interest;" criminal justice, healthcare, and regulatory. The consensus gained from these sessions included the need to have a truly "statewide" business plan for telecommunications. Many of the agencies were concerned that the State (particularly the ATS organization) did not have the capability to deliver and support the VoIP/IP Technology. Hence, those agencies prefer to move forward with their own implementation plans. All agencies agree there are several critical success factors that will influence any implementation strategies. These include:

- Reliability (System must work when needed).
- Adequate funding for roll out.
- Appropriate inter-agency cooperation.
- Central security to meet all needs.
- Statewide accessibility.

Conversely, the groups identified several barriers that must be overcome in order to execute a successful technology roll out:

- High initial capital expenditures.
- Lack of clarity on who provides security and how it is provided.

- Uncertainty on who provides "the last mile" of service delivery and how it is supported.
- Difficult political climate, in light of an election year with new legislators being elected and the budget deficit.
- Inadequate training of support personnel.
- Lack of an equitable fee schedule.
- Inadequate information available to policymakers to help them understand the cost structure of telecommunications service.

Although there were no immediate business application needs identified by the agencies, emerging needs were identified that support the continued upgrading of equipment to be capable of providing VoIP/IP Telephony. These include tele-computing, tele-medicine, video conferencing, and faster implementation of new applications.

C. Customer Care Processes

Most of the fourteen (14) agencies route calls for service to a centralized agency help desk function. Personnel with basic skills answer the initial call at the help desk. These personnel will attempt to resolve the problem upon receipt of the call. A majority of the agencies have some type of application software or database with which to generate a service ticket, both electronic and hard copy. If the problem cannot be resolved at the first level, the ticket is then routed to the appropriate technician or technical group (in the case of larger agencies) for resolution.

Some agencies will complete a follow-up call to the customer to ensure the service requested has been satisfactorily completed. In all cases the ticket is closed out and performance reports generated as required by agency management from these data. Smaller agencies may not have a help desk and may call technicians or technical management personnel directly for service requirements.

At present ADOA has multiple help desks to service LAN/WAN, telephony and application support needs. The agency is working toward the consolidation of these areas into a central support function. This improvement will be completed in the near term.

D. Strategic Analysis and Strategy

Strategy development requires basic information. Personal biases, politics, emotions, personalities, and halo error can overshadow the process without objective information and analysis. Assessment of internal and external factors and their estimated importance for the organization are the starting points for strategy formulation.

SWOT Analysis

A SWOT Analysis consists of a candid compilation and appraisal of an organization's Strengths, Weaknesses, Opportunities and Threats. This technique is typically used in formulating and evaluating strategy. The following SWOT is a compilation of results from sessions with ATS management and other agencies.

Strengths: Internal strengths that can be identified as key success factors (those necessary to remain competitive) in the telecommunications industry and which are competitive market advantages of the project include:

- ATS has a fully depreciated enterprise, carrier-class telephone system asset providing five 9's (down no more than 5 minutes per year) reliability and the capability to provide service for another 10 plus years.
- ATS delivers a variety of telecommunications services to multiple agencies throughout State Government including call center services.
- Some agencies have been moving toward the GITA Enterprise Architecture Target Standards as part of their refresh cycle.
- The State has a shared data network (MAGNET) in place serving the Capitol Mall and Tucson Complex.

Weaknesses: Internal weaknesses that might adversely impact the competitive position of the project:

- ATS prices are too high.
- ATS bills are difficult for customers to understand.
- Statewide lack of comprehensive network security and multiple instances of single points of failure.
- Statewide lack of trained/experienced personnel for VoIP/IP Telephony.
- Statewide lack of seamless communication across agencies through voice mail and address directories.
- Statewide lack of cost accounting policies and procedures among State Agencies to capture all IT costs.

Opportunities: External opportunities that the project might benefit from include:

- Current state of telecommunications industry provides for opportunities to negotiate better rates including the Carrier contracts that expire September 2003.
- Federal funding for security needs.
- Reduce ATS prices by consolidating all statewide telecommunications services and enforcing the legislated authority.
- Increase efficiency through emerging technology.

Threats: External threats that might impact the total cost of ownership/net cash flow of the project include:

- Budget constraints for funding equipment refresh and technology updates.
- Agency silos. This perpetuates information services and technology security risks given existing network back doors at agencies.
- Vendors marketing to individual agencies, undercutting ATS prices but not necessarily providing overall lower total cost of ownership for the State.
- Proprietary nature of most VoIP/IP vendor solutions.
- Lack of broadband telecommunications infrastructure in rural Arizona.

Internal Factor Evaluation

An Internal Factor Evaluation (IFE) Matrix summarizes and evaluates the major strengths and weaknesses in functional areas of a business. It also provides a basis for identifying and evaluating relationships among those areas. Scores range from a low of 1.00 to a high of 4.00. The higher the score, the stronger the internal position. Conversely, a lower score would indicate that the enterprise's current internal position is weak.

After conducting an internal assessment of the Arizona Telecommunications System (ATS) and other agency organizations currently providing telecommunications services to State Government, the following matrix emerged:

TABLE IV. INTERNAL FACTOR EVALUATION

KEY INTERNAL FACTORS	WEIGHT	RATING	WEIGHTING SCORE
<i>Internal Strengths</i>			
1. ATS has a fully depreciated enterprise, carrier-class telephone system asset providing five 9's reliability and the capability to provide service for another 10 plus years.	.10	3	.30
2. ATS delivers a variety of telecommunications services to multiple agencies throughout state government including call center services.	.10	3	.30
3. Some agencies have been moving toward the GITA Enterprise Architecture Target Standards as part of their refresh cycle.	.15	3	.45
4. The State has a wide area network (MAGNET) in place serving the Capitol Mall and Tucson Complex.	.15	3	.45
<i>Internal Weaknesses</i>			
1. ATS prices are too high.	.10	1	.10
2. ATS bills are difficult for customers to understand.	.05	1	.05
3. Statewide lack of comprehensive network security and multiple statewide single points of failure.	.15	1	.15
4. Statewide lack of trained/experienced personnel for VoIP/IP Telephony.	.10	1	.10
5. Statewide lack of seamless communication across agencies through voice mail and address directories.	.05	2	.10
6. Statewide lack of cost accounting policies and procedures amongst State Agencies to capture all Information Technology costs.	.05	1	.05
TOTAL	1.00		2.05
<i>Ratings: 4 major strength, 3 minor strength, 2 minor weakness, 1 major weakness</i>			

A total weighted score of 2.05, under the average score of 2.5, indicates that the current State's telecommunications delivery systems are inadequate. The matrix helps to identify specific areas where improvement strategies are required. Specifically, strategies are required to reduce overall telecommunications costs, to acquire a new billing system or to outsource billing, to strengthen security and eliminate single points of failure, and to attract, train and retain qualified staff. ADOA in its FY 2004 budget request has submitted critical issues relative to weaknesses one and three.

External Factor Evaluation

Having completed an IFE, the next step in the analysis of this project is to examine those external factors that can affect the viability of the project.

External factors include:

- Economic forces.
- Social and cultural forces.
- Technological forces.
- Competitive forces.
- Political and legal forces.

These factors play a significant role in strategic planning for all government and private sector business endeavors. While these factors are not controllable, data can be extracted and utilized in developing strategic plans to take advantage of or compensate for them. The goal in business planning is to take the extracted information and incorporate the data into a useable strategic business plan. Many of the various external factors affect not only this project but also the telecommunications industry as a whole. Since external factors cannot be controlled, this means the statewide telecommunications enterprise must make internal adjustments to fulfill its mission successfully. Five factors are pertinent to this project and are discussed in detail below.

Economic Forces.

BUDGET CRISIS

According to data compiled by the Goldwater Institute, the Arizona State budget more than doubled between 1990 and 2001. During the prosperous 1990's the citizens of Arizona saw an almost constant string of tax cuts without equivalent spending reductions resulting in unprecedented budget shortfalls.

To deal with a crisis of this magnitude, it is likely that State Agency spending will need to be reduced and that IT resources will not escape the budget ax. Therefore, it is imperative that the State leverage combined IT resources (processes, people, technology, and funds) to increase productivity, improve service delivery to the public and provide the infrastructure necessary for e-government.

Social and Cultural Forces.

AGENCY SILOS

The current stove-piped nature of telecommunications funding is an impediment to the successful implementation of an enterprise-wide telecommunications solution. Agency specific appropriations, federal matching grants and program-specific development are major obstacles to developing broader, customer-centric solutions. Additionally, historical data in Arizona and other states indicates that Agency Chief Information Officers (CIOs) and Agency Directors tend to focus first on agency specific priorities. Gartner Group states that “enterprise funding is the key to implementing customer-centric solutions and advancing the impact of e-government solutions.”

Technological Forces.

LACK OF STANDARDS IN VoIP AND RAPIDLY CHANGING TECHNOLOGY

As indicated in a recent Gartner Group report, nearly all vendor implementations of IP Telephony have some degree of proprietary features or interfaces (even those that claim to be industry standards-based). This is indicative of an emerging market where standards are not fully developed. Therefore, all enterprises looking to IP Telephony in the near term must be careful to procure an open, multi-service infrastructure to support all applications. As the Gartner Group correctly states “The value in open IP voice systems is the ability to break away from the traditional vertical integration of communications infrastructure, signaling, and control protocols and applications.”

Competitive Forces.

STATE OF THE INDUSTRY

Current market conditions apply a downward pressure on cost as vendors compete for limited market share. This requires vendors to set artificially low rates in order to increase cash flow and attract customers. Profitability no longer drives business decisions.

While this strategy fails in the long term, it provides immediate relief for short-term business problems. This is especially true in the financially plagued telecommunications industry. As market conditions improve, an upward pressure is placed on cost. Vendors are forced to recover profits and operating expenses accumulated in the depressed period. Service typically goes down while cost to the consumer goes up.

State Agencies not recognizing this marketing ploy set themselves up for significant rate increases combined with service degradation as the telecommunications industry recovers. Allowing agencies to pursue short-term solutions to long-term issues is negatively impacting the State and will ultimately result in higher total costs to State Government.

ATS BURDENED RATES

For the past several years, customer agencies of the ADOA Information Services Division have indicated that the rates charged by the division were excessive. This perception has led many agencies to seek alternative service providers, to develop in-house solutions and to resist consolidation efforts for information processing and/or telecommunications.

The Technology and Telecommunications (T & T) Fund receives all of its monies from charges to customers for services rendered. Therefore, all costs become part of the rates charged. A review of ISD's expenditures and the resultant rates revealed that the rates are not competitive due to inclusion of non-enterprise related and infrastructure costs artificially burdening the rate structure. Non-enterprise related costs add \$1,310,175 to the telecommunications rate base while infrastructure costs add an additional \$3,081,762.

Burdening the enterprise rates with non-enterprise related costs is in effect a tariff on ISD customers. This drives individual State agencies to seek specific solutions to avoid this defacto tariff. It also allows outside vendors to increase rates to compete with the ISD burdened rate rather than the true rate. The end result is a net increase in the total cost to State government.

EMPLOYEE TRAINING AND RETENTION

A continuing issue facing Telecommunications management today is the retention and recruitment of staff. Without technical resources, long range plans such as this Telecommunications Plan will not be accomplished. Enterprises worldwide are acquiring additional resources to adopt new technologies and remain competitive in the marketplace. At the same time there is an overall shortage of skilled professionals, and private enterprises are offering salary increases against which government cannot effectively compete. The need of government to change its personnel management to reflect private sector practices, e.g., frequent pay raises based on market rates, performance bonuses, simplified job/salary classifications, and streamlined personnel procedures, has been recognized but not resolved.

Political and Legal Forces.

UPCOMING CHANGE IN ADMINISTRATION

An undertaking of this magnitude cannot succeed without the support of the Office of the Governor and the Legislative Leadership. States that have experienced "breakthroughs" in telecommunications have had strong personal backing and involvement from their respective state Governors (e.g., Washington and Georgia). Additionally, those states received similar support from key legislative leaders. Obtaining early direction and strong support from these State executives is a critical first step in implementing changes to the current business model.

STATE PROCUREMENT PROCESS

The current State solicitation process normally involves the issuance of a detailed set of specifications to which prospective vendors respond. Vendors typically respond by replicating these specifications in order to be deemed “responsive.” This process precludes the possibility that other solutions may be better suited to tackle the original problem. A key to the success of this project will be the project’s ability to issue a simplified, outcome-based solicitation that will allow prospective vendors to apply their creativity in designing the best telecommunications solution for the State of Arizona.

CAPITAL INVESTMENT AND INFORMATION TECHNOLOGY FINANCING CONSTRAINTS (e.g., INABILITY TO BOND AND DEBT LIMIT)

At present, the State is facing major capital investment requirements relative to telecommunications. These expenditures fall into three basic areas: Infrastructure development, technology refresh and technology upgrades. With respect to the first category, data from the network gap analysis performed by the Government Information Technology Agency indicates the need to invest approximately \$20 million to bring current intra-building cabling into compliance with target Enterprise Architecture standards. Technology refresh costs associated with aging equipment that is at, or past, its useful life and taking advantage of convergence are estimated to be \$25.3 million over the next five years. Lastly, incremental costs associated with moving the State the next step, towards IP Telephony, are estimated to be \$66.5 million over the next five years. Faced with capital investments likely to approximate \$91.8 million, the State must develop creative public/private partnerships and financing solutions to address IT financing. Recent successes with the Privatized-Lease-to-Own program for construction of State buildings provide convincing evidence that an entrepreneurial approach to financing public projects is an effective way to deal with requirements for large capital investment.

Matrix: The External Factor Evaluation (EFE) matrix plays a role in how an enterprise can make changes in order to be competitive. These external forces continually change as the world changes. For this reason, companies need to reevaluate the external forces on a regular basis.

Scores range from a low of 1.00 to a high of 4.00. The higher the score, the better an organization is doing at taking advantage of the opportunities and avoiding threats. Conversely, a lower score would indicate that the enterprise’s current strategies are neither capitalizing on the opportunities nor mitigating the external threats. The following matrix shows an EFE rating for the current state of telecommunication as 1.95. This clearly indicates an urgent need to make significant modifications to the current business model. Arizona needs to strongly consider the resources available in the private sector either through Outsourcing or Co-sourcing. Many states have leveraged or are planning to leverage the economies of scale available through public/private partnerships.

TABLE V. EXTERNAL FACTOR EVALUATION

KEY EXTERNAL FACTORS	WEIGHT	RATING	WEIGHTING SCORE
Opportunities			
1. Current state of telecommunications industry provides for opportunities to negotiate better rates including the Carrier contracts that expire September 2003.	.10	4	.40
2. Federal funding for security needs.	.05	3	.15
3. Reduce ATS prices by consolidating all statewide telecommunications services and enforcing the legislated authority.	.05	3	.15
4. Increase efficiency through emerging technology.	.10	4	.40
Threats			
1. Budget constraints for funding equipment refresh and technology updates.	.15	1	.15
2. Agency silos. This perpetuates information services and technology security risks (e.g., existing network back doors at agencies).	.25	1	.25
3. Vendors marketing to individual agencies, undercutting ATS prices but not necessarily providing overall lower total cost of ownership for the State.	.10	2	.20
4. Proprietary nature of today's VoIP/IP Telephony vendor solutions.	.15	1	.15
5. Lack of broadband telecommunications infrastructure in Rural Arizona.	.05	2	.10
TOTAL	1.00		1.95
Ratings: 4 major opportunity, 3 minor opportunity, 2 minor threat, 1 major threat			

Strategy Evaluation

Threats-Opportunities-Weaknesses-Strengths (TOWS) Matrix. The Threats-Opportunities-Weaknesses-Strengths (TOWS) Matrix relies upon information derived from the IFE and EFE to match external opportunities and threats with internal strengths and weaknesses. Matching external and

internal critical success factors is essential to devising feasible alternative strategies. The statewide telecommunications enterprise will utilize the strategies identified in the TOWS matrix. The SO strategies shown in the table below use internal strengths to take advantage of external opportunities. The WO strategies aim at improving internal weaknesses by taking advantage of external opportunities. ST strategies use strengths to avoid or reduce the impact of external threats. WT strategies are defensive tactics directed at reducing internal weaknesses and avoiding environmental threats.

Table VI. TOWS Matrix

	<p><u>Strengths – S</u></p> <ol style="list-style-type: none"> 1. ATS has a fully depreciated enterprise, carrier-class telephone system asset providing five 9's reliability and the capability to provide service for another 10 plus years. 2. ATS has the ability to deliver a variety of telecommunications services to multiple agencies throughout state government including call center services. 3. Many agencies have been moving toward the GITA Enterprise Architecture Target Standards as part of their refresh cycle. 4. The State has a wide area network (MAGNET) in place serving the entire Capitol Mall and Tucson Complex. 	<p><u>Weaknesses – W</u></p> <ol style="list-style-type: none"> 1. ATS prices are too high. 2. ATS bills are difficult for customers to understand. 3. Statewide lack of comprehensive network security and single points of failure. 4. Statewide lack of trained/experienced personnel for VoIP/IP Telephony. 5. Statewide lack of seamless communication across agencies through voice mail and address directories. 6. Lack of cost accounting policies and procedures amongst State Agencies to capture all Information Technology costs.
<p><u>Opportunities – O</u></p> <ol style="list-style-type: none"> 1. Current state of telecommunications industry provides for opportunities to negotiate better rates including the Carrier contracts that expire September 2003. 2. Federal funding for security needs. 3. Reduce costs by consolidating all statewide telecommunications services. 4. Increase efficiency through emerging technology. 	<p><u>SO Strategies</u></p> <ol style="list-style-type: none"> 1. Reduce costs by leveraging ATS infrastructure to consolidate statewide telecommunications services. (S1&2, O3) 2. Obtain federal funds to upgrade MAGNET providing security for the entire Capitol Mall area (Operation Enclave). (S4, O2) 3. Implement updated technology taking advantage of the current better rate opportunities in the telecommunications industry and infrastructure readiness of some agencies. (S3, O1) 4. Leverage campus data network to enable new technology capabilities. (S4, O4) 	<p><u>WO Strategies</u></p> <ol style="list-style-type: none"> 1. Reduce costs by consolidating all statewide telecommunications services. (W1, O3) 2. Take advantage of the current better rate opportunities in the telecommunications industry and update or outsource the billing system and update or outsource the telecommunications technology to provide seamless communication across all agencies. (W2&5, O1) 3. Hire qualified VoIP/IP Telephony personnel available at lower salaries or outsource at better rates due to the current state of the telecommunications industry. (W4, O1) 4. Obtain federal funding to upgrade MAGNET providing security for the entire Capitol Mall area (Operation Enclave). (W3, O2) 5. Obtain greater accountability and minimize single points of failure through new technologies and

		public/private partnerships. (W3&6, O3 &4)
<p><u>Threats – T</u></p> <ol style="list-style-type: none"> 1. Budget constraints for funding equipment refresh and technology updates. 2. Agency silos. This perpetuates information services and technology security risks given existing network back doors at agencies. 3. Vendors marketing to individual agencies, undercutting ATS prices but not necessarily providing overall lower total cost of ownership for the State. 4. Proprietary nature of today's VoIP/IP Telephony vendor solutions. 5. Lack of broadband telecommunications infrastructure in Rural Arizona. 	<p><u>ST Strategies</u></p> <ol style="list-style-type: none"> 1. Leverage ATS infrastructure to provide telecommunications services to minimize budget constraints and current lack of stable standards with new technologies. (S1&2, T1&4) 2. Leverage ATS infrastructure to provide and manage telecommunications services and remove network back doors minimizing security risks. (S1&2, T2) 3. Centralize all telecommunications procurement with ATS leveraging their infrastructure and ability to deliver a variety of telecommunications services throughout the State and minimize erosion by vendors of efficient use of State budgets. (S1&2, T3) 	<p><u>WT Strategies</u></p> <ol style="list-style-type: none"> 1. Centralize telecommunications IT management for the State to avoid agency silo mentality and vendors marketing to individual agencies which increases security risks and inefficient use of State budget. (W3, O2&3) 2. Privatize telecommunications IT to acquire trained personnel on VoIP/IP Telephony, update technology without risk of paying debt on technology where industry standards are changing, and lower costs leveraging current state of the telecommunications industry. (W1,4&5, O1&4)

IX. Telecommunications Technology

A. State Standards

The enterprise architecture-related targets for networks and platforms related to telecommunications are shown in the table on the next page. The table has been compiled from the technical architecture domain documents and related standards approved by the Arizona CIO Council, Information Technology Authorization Committee (ITAC), and the State CIO. The goal of the “target” technology designation is to communicate a direction for change that aligns agencies over time for interoperability, reinforcing the Arizona’s Information Technology Policy P100.

The target technology will be selected and purchased when change occurs in response to a business need. Taking this long-term view ensures agencies continue to harness appropriate technology in a way that meets business needs and allows the advantages of simplifying and unifying assets and support methods across the enterprise. While the existence of a target does not mandate immediate change, it does communicate the State’s technology direction to agencies.

TABLE VII: TARGET ARCHITECTURE	
Technology	Target
Network Layer 1: Physical	Category 5e UTP (supersedes Category 5 UTP), 50/125-micron multimode fiber, 8/125-micron single mode fiber Logical star topology, SONET, ISDN/PRI, xDSL, cable modem protocols
Network Layer 2: Data Link	Open-standards-based, multi-service networks; 100/1000 Ethernet; 802.11 LAN, 802.16 MAN Wireless Ethernet; Frame Relay; ATM
Network Layers 3 & 4: Network and Transport	Converged networks with prioritization for all services; switched, multi-segment design; TCP/IP, UDP
Platforms	Platforms having industry de facto standard operating systems with imbedded security, open-standard interfaces and drivers, including: <ul style="list-style-type: none"> - IP telephony systems with TCP/IP, SIP, Open APIs - Hybrid IP telephony (TDM/IP) systems with TCP/IP, SIP, Open APIs - Telephones having TCP/IP and multi-function applications
Platform-Related Connectivity	Platforms deployed on target networks, having class of service (CoS) and quality of service (QoS) availability

B. Technology Refresh

Inventory data revealed significant infrastructure gaps and aging telecommunications equipment. Whether or not the State moves forward with VoIP/IP Telephony, substantial telecommunication investments will be required in the next five years.

The following elements represent the major components of a telecommunications system that must be refreshed on a scheduled basis:

Transport: Inside and outside cable plants have been identified for refresh in the Network Gap Analysis conducted by GITA. Modifications to carrier-provided circuits, which will require up front design and engineering efforts, must be made to accommodate combined voice, video, and data traffic.

Network Equipment: Updated network equipment that ties the aforementioned cabling and carrier circuits together and provides high-speed quality of service capabilities for real-time applications is needed. Periodic network equipment upgrades are performed by individual agencies today,

however a more aggressive upgrade schedule will be required if the State is to realize the net gain promises of VoIP/IP Telephony.

Client & Server Platforms: The upgrade and/or replacement of PBXs and Key Systems are required if a *true* VoIP/IP Telephony client/server environment is to be created. The term “client/server” refers to an architecture that establishes an abstraction layer between different parts of telecommunications-based technology. Server technology includes mainframes and LAN file and print servers. Client technology consists of most end-user appliances such as PCs, PDAs, telephone handsets, etc. A traditional telephone system has telephones tethered directly to it. In a client/server environment, the telephone system becomes a server and the telephones become clients of the server. Sitting between the client and server systems is the network, which is comprised of transport and equipment (see above). The separation of client appliances from server systems also applies to other value-add services supplied via a common network. Call center, video conferencing, unified messaging, and workgroup collaboration are other examples of special-purpose servers whose services are acquired by clients (and other servers) via the shared network. The more services the network has to offer, the greater the overall utility of the *total system*.

Applications: Telephony, contact management, and unified messaging are examples of applications in the client/server architecture. Each application provides a specific type of functionality. Some applications require customization. For example, an IVR call center application must be programmed to direct and/or respond to specific caller or Web visitor inquiries. The level and type of customization is dependent on the needs of the serving State agency as they provide services to their customer.

Transport, network equipment, and client and server systems are to a great extent general purpose/utility products and services that are universally applied to satisfy most customer needs. It is the *application* that distinguishes agency programs and work units from one another as they deliver services to their customers and stakeholders. Only ADOT, for example, builds freeways. Therefore, the applications ADOT needs are centered on transportation. No other agency in State Government provides this type of service.

If an organization is faced with having to re-target an application to a new platform, the cost, time and effort necessary to develop or migrate the application cannot be overemphasized. Because of the unique characteristics associated with agency customized application requirements, a tremendous amount of resources will most assuredly be required to complete the transition.

Project management, contract management, operations management, ongoing system administration and customer support services will continue as ongoing requirements regardless of the service delivery model selected in addition to the costs associated with designing, constructing, maintaining and refreshing the telecommunications-based elements.

C. VoIP/IP Telephony

The State of Arizona is deeply entrenched in traditional data and voice technology. The recent evolution of telecommunications technology has been to converge these traditional data and voice networks to provide a more streamlined and cost effective approach to delivering telecommunications and data access. This convergence is referred to as VoIP/IP Telephony.

VoIP refers to Voice over Internet Protocol and is essentially voice transmitted as packets over a data network. The base value proposition for VoIP is toll bypass and the reduction of the voice circuits.

IP Telephony refers to Internet Protocol Telephony and is the target replacement technology of traditional telephone systems. IP Telephony systems are also based on a client-server architecture making it possible to distribute call processing and minimize single points of failure. This architecture has just recently been able to provide the features and functionality available from the traditional telephone systems. IP Telephony provides a perceived reduction of costs associated with the administration of telephone set moves, adds and changes (MAC's) and enables the implementation of new integrated voice/data applications. VoIP can be implemented for toll bypass separate from IP Telephony.

Agencies have been upgrading their infrastructure during their normal refresh cycles aligning themselves with the GITA Enterprise Architecture Target Standards and positioning themselves to migrate to a VoIP/IP Telephony solution. In a few instances, VoIP has been implemented for toll bypass.

In development of the costs to implement VoIP/IP Telephony, the costs to provide a more secure, service oriented, higher capacity and redundant infrastructure by updating the MAGNET technology were not included. These costs are included in the ADOA Security Upgrade budget issue and are considered necessary for the State regardless of the implementation of VoIP/IP Telephony.

Converging traditional data and voice networks and implementing VoIP/IP Telephony requires investment in several areas. These include:

- Cable plant upgrades in older buildings to CAT 5e.
- Upgrades to equipment closets for power, environmental needs like air conditioning, and additional data rack and cable management components.
- Upgrades of proactive network monitoring tools.
- Upgrades to the existing data network to enable quality of service (QoS) support for voice and video services.
- Increases to the capacity of data circuits where needed.
- Training of personnel.
- IP Telephony equipment.
- A qualified systems integrator (usually 10% of investment).

A trade-in value of 10% of equipment investment is included in the financial analyses.

With VoIP/IP Telephony, the State anticipated savings required for debt service over the current traditional telephony environment in the areas of:

- Reduction/elimination of costs for moves, adds and changes (MACs) of telephone sets as users can move their own telephone sets in the IP Telephony environment.
- Reduction in the number of private network voice circuits as the State moves its voice traffic onto the data network.
- Reduction in long distance costs by moving those calls to the data network (toll bypass).
- A reduction in the number of personnel by converging to one network versus the management of many separate networks.
- Reduction of maintenance costs.

VoIP/IP Telephony also allows for easier implementation of new applications such as video conferencing, tele-computing, unified messaging, and web-based system management/administration. Cost savings for the implementation of these applications are not part of this analysis.

A 5-year migration view to VoIP/IP Telephony was developed. Agency locations were migrated over 5 years based on the following criteria: life cycle and exhaustion of capacity of current PBX/Key System and the need to replace, data network readiness and 4-year refresh cycles, and cable upgrades needed. Below are the breakout of costs and savings by year. Detail on the assumptions used in the development of this financial view are in Appendix F.

(In Thousands)

TABLE VIII: IMPLEMENTATION COSTS

Implementation Costs/(Savings)	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cable Upgrades to Cat 5e	5,789.8	5,202.2	5,043.8	4,964.6	4,964.6	25,965.0
Closets Upgrades	508.9	459.1	425.9	409.4	409.4	2,212.7
Data Network Refresh Equip.	7,547.6	3,271.3	3,271.3	3,271.3	3,271.3	20,632.8
Data Network Refresh Install	811.3	648.7	648.7	648.7	648.7	3,406.1
Data Network Circuit Capacity			429.0			429.0
Network Monitoring Tools	2,917.7					2,917.7
IP Telephony Equipment	8,664.9	6,210.0	5,791.3	5,582.0	4,724.2	30,972.4
IP Telephony Installation	2,553.7	1,896.6	1,780.6	1,722.7	1,710.5	9,664.1
Training of Personnel	197.2	164.6	155.2	150.6	150.6	818.2
Trade-In Value	(1,621.3)	(948.1)	(906.3)	(885.3)	(799.6)	(5,160.6)
Total Costs	27,369.8	16,904.4	16,639.5	15,864.0	15,079.7	91,857.4
Annual Debt Service*	5,960.2	9,641.3	13,264.9	16,719.4	20,003.2	65,589.0
Less: Base Capital Budget	(11,357.1)	(11,357.1)	(11,357.1)	(11,357.1)	(11,357.1)	(56,785.5)
Net Loss/(Savings)	(5,396.9)	(1,715.8)	1,907.8	5,362.3	8,646.1	8,803.5

(In Thousands)

TABLE IX: ONGOING COSTS/SAVINGS REQUIRED FOR DEBT SERVICE

Ongoing Costs/(Savings)	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Data Network Refresh		551.7	875.3	1,198.9	1,522.6	4,148.5
Network Monitoring Tools		106.3	212.6	318.9	425.2	1,063.0
Replace by Data Network Refresh Maintenance	(80.9)	(242.6)	(404.4)	(566.1)	(647.0)	(1,941.0)
IP Telephony		2,013.3	2,954.1	3,409.1	3,833.2	12,209.7
Replace by IP Telephony Maintenance	(121.9)	(330.9)	(500.7)	(661.7)	(805.4)	(2,420.6)
Net Maintenance	(202.8)	2,097.8	3,136.9	3,699.1	4,328.6	13,059.6
Data Network Circuit Capacity	0	0	1,013.8	1,013.8	1,013.8	3,041.4
Circuits	(137.1)	(411.4)	(685.7)	(960.0)	(1,097.1)	(3,291.3)
Toll Bypass	0	(156.6)	(469.7)	(1,174.2)	(2,504.9)	(4,305.4)
Personnel	0	0	(308.7)	(514.4)	(1,028.9)	(1,852.0)
MACs	(477.9)	(814.5)	(1,134.2)	(1,437.1)	(1,689.6)	(5,553.3)
Total Expenses/(Savings) for Debt Service	(817.8)	715.3	1,552.4	627.2	(978.1)	1,099.0
Net Loss/(Savings)	(6,214.7)	(1,000.5)	3,460.2	5,989.5	7,668.0	9,902.5

*Debt Service Remaining after Year 5 is \$34,427.2

X. Discussion of Service Delivery Options

Service delivery of telecommunications services can vary both by structure and by who is delivering the services. The structure can be:

- Centralized - where the services and maintenance are contracted, managed, and delivered via a single point of contact agency or entity.
- Decentralized – where the services and maintenance are contracted, managed, and delivered via individual State agencies.
- Shared Services – where services are centrally contracted, managed and delivered to leverage economies of scale and ensure security functions and decentralized where it makes business sense. (e.g., centralizing voice and WAN telecommunications and decentralizing specific LAN-based equipment and services (e.g., servers, workstations, and associated peripherals).

Delivery of the services can be:

- Privatized – The services and maintenance are provided by a vendor also referred to as outsource.

- In-Source – The services and maintenance are provided by in-house State staff.
- Co-Source – The services and maintenance are provided in a combination of in-house and vendor staff.

Four viable options were analyzed for this report:

- “As Is” – current structure for delivery of telecommunication services which is approximately 30% centralized and 70% decentralized with services delivered via co-source with a combination of in-house and vendors.
- Decentralized Co-Source – Will be referred to as Decentralized in this document. Telecommunication services are managed by each individual agency with some services and maintenance provided by vendors.
- Shared Services Co-Source – Will be referred to as Shared Services in this document. Telecommunication services and maintenance are centralized for economic or security needs.
- Centralized Privatization – Will be referred to as Privatized in this document is a 100% outsource of all telecommunications services and maintenance of those services with the vendor management from a centralized organization. The infrastructure can either be owned by the vendor or the State can retain ownership and outsource the management of the facilities.

For the four options, the team looked at three approaches: 1) changing the service delivery options only, 2) upgrading the data network infrastructure to enable toll by-pass and 3) a full implementation of VoIP/IP Telephony to the desktop including the handset.

A. “As Is”

The State of Arizona current “As Is” delivery of telecommunication services is a combination of centralized and decentralized structure and services provided in-house and by vendors. ATS provides services to 14,000 telephone lines to the State’s 42,000 employees. ATS services range from one to many, including telephone voice services, Internet access, Inter-LATA communications, network access, web hosting, and call center support. Appendices D1 through D3 detail services delivered by ATS to the agencies. For the employees not utilizing ATS, the services are either provided in-house by their agency or procured directly from the vendor via ATS developed contracts.

The benefits of the “As Is” service delivery model are: 1) control of most IT decisions can be made within the individual agencies, 2) small agencies gain technology support and expertise from ATS, and 3) ease of spending non-appropriated funds on agency specific technology. The risks associated with “As Is” are: 1) maintaining network security throughout the State’s enterprise, 2) duplication of staffing, 3) lack of seamless integration of telecommunications services, and 4) the inability to uniformly apply Best Practices statewide.

The following tables identify the impact to the State’s Total Cost of Ownership with the “As Is” service delivery option for 1) data network upgrade (refresh) only, and 2) an implementation of IP Telephony. The data network upgrades move the State to VoIP

allowing for toll bypass opportunities. An implementation of IP Telephony involves taking IP to the desktop including the telephone handset. The implementation of IP Telephony is based on the assumptions used in the Discussions of Options – VoIP/IP Telephony section of this document. A detailed financial analysis can be found in Appendix F.

(In Thousands)

TABLE X: “AS IS” 5-YEAR DATA NETWORK UPGRADE ONLY			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	(1,053.2)	65,315.5
Year 2	66,368.7	(8,023.1)	58,345.6
Year 3	66,368.7	(7,314.5)	59,054.2
Year 4	66,368.7	(8,766.2)	57,602.5
Year 5	66,368.7	(10,505.8)	55,862.9
5-Year Total	331,843.5	(35,662.8)	296,180.7
Debt Service Remaining	0.0		

(In Thousands)

TABLE XI: “AS IS” 5-YEAR WITH FULL IP TELEPHONY IMPLEMENTATION			
	FY TCO	Adjustments	Future TCO
Year 1	66,368.7	(6,214.7)	60,154.0
Year 2	66,368.7	(1,000.3)	65,368.4
Year 3	66,368.7	3,460.3	69,829.0
Year 4	66,368.7	5,989.5	72,358.2
Year 5	66,368.7	7,668.1	74,036.8
5-Year Total	331,843.5	9,902.9	341,746.4
Debt Service Remaining	34,427.2		

B. Decentralized

The Decentralized model eliminates any central State entity from providing and maintaining telecommunication services. All agencies will contract, manage and deliver their own telecommunications services.

The benefits of the Decentralized model are: 1) agency control over all technology related decisions, and 2) potential to implement new applications faster without having to wait for a centralized entity to upgrade.

The risks associated with the Decentralized model are: 1) lack of technology support for small agencies, 2) lack of seamless interagency communication and connectivity, 3) duplication of staffing and facilities, and 4) lack of effective security and disaster recovery throughout State Government.

The Decentralized model eliminates the ATS organization and costs including the switchboard operators. This transition was assumed to take 1 year. Agencies that were utilizing ATS services, except for agency locations under 35 employees, would implement VoIP/IP Telephony as they transition from ATS since it would make good business sense to migrate towards the GITA standard during this transition. Agency locations under 35 employees were assumed to procure Centrex services from a Telecommunications Carrier (e.g., QWest, Citizens). IT resource needs of the agencies were based on best-in-class standards. The agencies not using ATS today were migrated to VoIP/IP Telephony based on the assumptions used in the Discussions of Options - VoIP/IP Telephony section of this document.

The following tables identify the impact to the State's Total Cost of Ownership with the Decentralized service delivery option for 1) data network upgrade (refresh) only, and 2) an implementation of IP Telephony. The data network upgrades move the State to VoIP allowing for toll bypass opportunities. An implementation of IP Telephony involves taking IP to the desktop including the telephone handset. The implementation of IP Telephony is based on the assumptions used in the Discussions of Options – VoIP/IP Telephony section of this document with the exception of the agencies procuring telephony from ATS and migrating to IP Telephony or Centrex during the year 1 transition. A detailed financial analysis can be found in Appendix F.

(In Thousands)

TABLE XII: DECENTRALIZED 5-YEAR DATA NETWORK UPGRADE ONLY			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	36,186.7	102,555.4
Year 2	66,368.7	(7,704.4)	58,664.3
Year 3	66,368.7	(7,245.0)	59,123.7
Year 4	66,368.7	(8,578.2)	57,790.5
Year 5	66,368.7	(8,958.4)	57,410.3
5-Year Total	331,843.5	3,700.7	335,544.2
Debt Service Remaining	0.0		

(In Thousands)

TABLE XIII: DECENTRALIZED 5-YEAR WITH FULL IP TELEPHONY IMPLEMENTATION			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	2,209.2	68,577.9
Year 2	66,368.7	2,393.7	68,762.4
Year 3	66,368.7	6,097.6	72,466.3
Year 4	66,368.7	7,737.0	74,105.7
Year 5	66,368.7	7,540.4	73,909.1
5-Year Total	331,843.5	25,977.9	357,821.4
Debt Service Remaining	23,572.7		

C. Shared Services

With Shared Services, telecommunication services and maintenance are centralized for economic or security needs.

The benefits of Shared Services are: 1) a cohesive vision and implementation of telecommunication services, 2) seamless interoperability of equipment and services, 3) better management of security and disaster recovery, 4) savings in carrier, equipment and IT personnel costs, and 5) centralized asset tracking and reporting.

The risks of Shared Services are: 1) re-allocation of telecommunications IT resources (people, processes, technology, funds), 2) determining lines of demarcation, and 3) agency buy-in is needed for success.

For Shared Services, all telecommunication services are centrally contracted, managed and delivered through a private/public partnership with the exception of specific LAN-based equipment and services (e.g., servers, workstations, and associated peripherals). The State would realize savings in FTEs with the centralizing of telecommunications services.

The following tables identify the impact to the State's Total Cost of Ownership with the Shared Services service delivery option for 1) data network upgrade (refresh) only, and 2) an implementation of IP Telephony. The data network upgrades move the State to VoIP allowing for toll bypass opportunities. An implementation of IP Telephony involves taking IP to the desktop including the telephone handset. The implementation of IP Telephony is based on the assumptions used in the Discussions of Options – VoIP/IP Telephony section of this document. A detailed financial analysis can be found in Appendix F.

(In Thousands)

TABLE XIV: SHARED SERVICES 5-YEAR DATA NETWORK UPGRADE ONLY			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	(1,053.2)	65,315.5
Year 2	66,368.7	(8,537.5)	57,831.2
Year 3	66,368.7	(8,343.4)	58,025.3
Year 4	66,368.7	(9,795.1)	56,573.6
Year 5	66,368.7	(11,534.6)	54,834.1
5-Year Total	331,843.5	(39,263.8)	292,579.7
Debt Service Remaining	0.0		

(In Thousands)

TABLE XV: SHARED SERVICES 5-YEAR WITH FULL IP TELEPHONY IMPLEMENTATION			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	(6,214.7)	60,154.0
Year 2	66,368.7	(1,514.8)	64,853.9
Year 3	66,368.7	2,431.4	68,800.1
Year 4	66,368.7	4,960.6	71,329.3
Year 5	66,368.7	6,639.2	73,007.9
5-Year Total	331,843.5	6,301.7	338,145.2
Debt Service Remaining	34,427.2		

D. Privatized

With the privatized model, there is a wide spectrum of options for private sector participation. These options may be classified into two groups: those that retain public ownership of the assets while contracting out management, operation, and even investment, and those that involve at least partial or temporary private ownership of assets.

The benefits of a centralized structure are: 1) a clear and cohesive vision and direction for statewide telecommunications, 2) consistent leadership, and 3) interoperability and seamless communication between agencies. The perceived benefits of privatization are: 1) the State gets already trained and competent personnel for new technologies, 2) if the vendor provides the equipment and services, the State does not need seed money for large capital investments, 3) with the rapid changing of technology and lack of standards with VoIP/IP Telephony, the State avoids the position of servicing debt on obsolete equipment as the vendor is now responsible for upgrading the technology, 4) vendor management is simplified, and 5) service level agreements are financially driven.

The risks associated with privatization are: 1) not achieving stated cost savings, 2) not achieving contractual state service levels, 3) long-term contracts that reduce and/or eliminate the State's flexibility to in/out-task functions as needed, and 4) organizational change impacts to employees.

Most vendors or integrators expect to provide a 10% to 15% value proposition in a privatized solution for an enterprise. Some of the value comes from improved service level agreements as well as cost savings. The five-year savings are based on privatization bids by other states in the process of implementing privatized solutions. The privatized financial views provide for the least overall cost impact to the state.

The following tables identify the impact to the State's Total Cost of Ownership with the Privatized service delivery option for 1) data network upgrade (refresh) only, and 2) an implementation of IP Telephony. The data network upgrades move the State to VoIP allowing for toll bypass opportunities. An implementation of IP Telephony involves taking IP to the desktop including the telephone handset. The implementation of IP Telephony is based on the assumptions used in the Discussions of Options – VoIP/IP Telephony section of this document. A detailed financial analysis can be found in Appendix F.

(In Thousands)

TABLE XVI: PRIVATIZED 5-YEAR DATA NETWORK UPGRADE ONLY			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	(1,670.5)	68,039.2
Year 2	66,368.7	(9,257.7)	57,111.0
Year 3	66,368.7	(8,549.2)	57,819.5
Year 4	66,368.7	(10,000.8)	56,367.9
Year 5	66,368.7	(11,740.4)	66,368.7
5-Year Total	331,843.5	(41,218.6)	290,624.9
Debt Service Remaining	0.0		

(In Thousands)

TABLE XVII: PRIVATIZED 5-YEAR WITH FULL IP TELEPHONY IMPLEMENTATION			
	FY 2002 TCO	Adjustments	Future TCO
Year 1	66,368.7	(6,832.0)	59,536.7
Year 2	66,368.7	(2,235.0)	64,133.7
Year 3	66,368.7	2,225.7	68,594.4
Year 4	66,368.7	4,754.8	71,123.5
Year 5	66,368.7	6,433.4	72,802.1
5-Year Total	331,843.5	4,346.9	336,190.4
Debt Service Remaining	34,427.2		

XI. CONCLUSIONS

- The Internal Factor Evaluation (IFE) indicates that the current State's telecommunications delivery systems are inadequate.
- The External Factor Evaluation (EFE) clearly indicates that present strategies are neither taking advantage of emerging opportunities nor avoiding external threats.
- There were no immediate, driving applications that would necessitate State government moving forward with a wholesale implementation of VoIP/IP Telephony.
- There are standard business needs (e.g., infrastructure gaps, equipment obsolescence, security, and disaster recovery) that support the gradual migration to VoIP/IP Telephony.
- The results of the cost evaluation, shown on the next page, indicate that the "As Is" and Decentralized service delivery models do not produce favorable 5-Year budget impacts.
- The results of the cost evaluation indicate that the Shared Services and Privatized service delivery models do offer favorable 5-Year budget impacts.
- The Privatized Model appears to offer the most potential.

(In Thousands)

TABLE XVIII: TOTAL COST OF OWNERSHIP DATA NETWORK UPGRADE ONLY				
	"As Is"	Decentralized	Shared Services	Privatized
Year 1	(1,053.2)	36,186.7	(1,053.2)	(1,670.5)
Year 2	(8,023.1)	(7,704.4)	(8,537.5)	(9,257.7)
Year 3	(7,314.5)	(7,245.0)	(8,343.4)	(8,549.2)
Year 4	(8,766.2)	(8,578.2)	(9,795.1)	(10,000.8)
Year 5	(10,505.8)	(8,958.4)	(11,534.6)	(11,740.4)
5-Year Total Increase/(Decrease)	(35,662.8)	3,700.7	(39,263.8)	(41,218.6)
Debt Service Remaining	0.0	0.0	0.0	0.0

(In Thousands)

TABLE XIX: TOTAL COST OF OWNERSHIP WITH FULL IP TELEPHONY IMPLEMENTAION				
	"As Is"	Decentralized	Shared Services	Privatized
Year 1	(6,214.7)	2,209.2	(6,214.7)	(6,832.0)
Year 2	(1,000.3)	2,393.7	(1,514.8)	(2,235.0)
Year 3	3,460.3	6,097.6	2,431.4	2,225.7
Year 4	5,989.5	7,737.0	4,960.6	4,754.8
Year 5	7,668.1	7,540.4	6,639.2	6,433.4
5-Year Total Increase/(Decrease)	9,902.9	25,977.9	6,301.7	4,346.9
Debt Service Remaining	34,427.2	23,572.7	34,427.2	34,427.2
Total Cost	44,330.1	49,550.6	40,728.9	38,774.1

XII. RECOMMENDATIONS

Given the internal weaknesses identified in the IFE and the challenges identified in the EFE, Arizona State Government needs to:

- Adopt a centralized governance model with strong executive authority and Legislative involvement.
- Centralize telecommunications funding to leverage resources and gain greater accountability.
- Strongly consider the resources available in the private sector either through outsourcing (leveraging the economies of scale available through public/private partnerships) or co-sourcing (shared services) to improve efficiency, acquire expertise and ease the financial burden.

While there were no immediate, driving applications that would necessitate State government moving forward with a wholesale implementation of VoIP/IP Telephony, there are standard business needs that support the gradual migration to VoIP/IP Telephony. The needs of the agencies are wide and varied, ranging from the necessity to complete basic infrastructure build-out, to initial installations of new technologies. For example, many of the State's telephone PBXs and small office Key Systems are near the end of or past their useful life.

Additionally, opportunities exist for agencies with remote sites to reduce overall costs through savings initiatives such as toll bypass available with the newer technology.

Based upon the results of the Phase II cost evaluation, the State should eliminate from further consideration both the "AS IS" and Decentralized service delivery models as they do not provide any potential for positive budget impacts.

The State should pursue either the Shared Services or the Privatized service delivery model as both offer favorable 5-year budget impacts. The ADOA Privatized financial analysis was based upon the State retaining ownership of the assets. Both of the ADOA cost analyses showed favorable 5-Year budget impacts. An alternative Privatization scenario, private ownership of assets, is favored by GITA. However, as indicated by the ADOA cost evaluation, and consistent with the Phase I findings, the Privatized Model appears to offer more potential.

The State of Arizona should, if it retains ownership of the assets under either the shared services or outsourcing models, systematically proceed with the implementation of VoIP/IP Telephony based upon agency business requirements, a favorable cost/benefit analysis, organizational readiness and available funding. With private sector participation that involves private ownership of assets, the State would specify service requirements, features, functions, security and penalties for non-performance. The State would not specify the technology, but clearly the requirements will dictate the vendor(s) technology selections.

XIII. NEXT STEPS

- Seek any legislative changes required to adopt a centralized governance model with strong executive authority and Legislative involvement.
- Seek any legislative changes required to centralize telecommunications funding.
- Establish a telecommunications stakeholder committee with legislative input.
- Secure an appropriation for consultant support to draft a Request For Proposals (RFP), understanding that the outside consultant would be removed from bidding.
- Convene RFP committee, establish a charter, assign work groups, and define requirements.
- Create an RFP to outsource all statewide telecommunications operations with Service Level Agreements (including call center operations, billing, and customer relationship elements) that would provide full flexibility for vendors to bid on all degrees of ownership.
- Finalize, publish and issue the RFP.
- Review RFP responses including vendor responses regarding Statewide FTE transition.
- Award contract(s). Target: October 2003.